REMARKS

Claims 1-3 and 5 are currently pending. By this response, no claims have been amended. Thus, no new matter has been introduced.

Reconsideration of the above-identified application is respectfully requested in view of the following remarks.

Rejections under 35 U.S.C. §103:

Claims 1 and 2 have been rejected under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 4,647,174 to Tsunekawa *et al.* (hereafter "Tsunekawa") in view of US Patent No. 6,192,163 to Murayama (hereafter "Murayama").

Claim 3 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Tsunekawa in view of Murayama and further in view of US Patent No. 5,995,114 to Sasakura (hereafter "Sasakura").

Claim 5 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Tsunekawa in view of Murayama and further in view of US 2002/0101531 to Kaneda (hereafter "Kaneda").

Claim 5 has also been rejected under 35 U.S.C. §103(a) as being unpatentable over Tsunekawa in view of Murayama and further in view of US Patent No. 5,349,409 to Kawasaki *et al.* (hereafter "Kawasaki").

Applicants respectfully traverse the foregoing rejections to the extent that such rejections may be considered applicable to the claims, on the following basis. Initially, Applicants submit that the Examiner fails to established a *prima face* case of obviousness. In particular, Applicants assert that the combination of the cited references, as proposed by the Examiner, fails to teach or suggest each and every feature of the claimed subject matter, at least, as recited in claim 1. The Manual of Patent Examination Procedure (MPEP) provides that "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re* Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." Also, see *In re* Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). [MPEP §2143.03].

In the present case, the currently pending independent claim 1 recites:

"A focus detection device comprising:

a solid-state image sensing device including a first photoelectric conversion element array which photoelectrically converts a first light beam passing through a first area of an exit pupil of a photographing optical system, and a second photoelectric conversion element array which photoelectrically converts a second light beam passing through a second area of the exit pupil which is different from the first area,

wherein every two photoelectric conversion elements of said first and second photoelectric conversion element arrays include a microlens positioned such that the first light beam passing through the first area of the exit pupil and the second light beam passing through the second area of the exit pupil focuses on a first and a second photoelectric conversion element respectively; and

a computing device which detects a focus state of the photographing optical system by computing a correlation between a first shading-corrected image signal which is an image signal from the first photoelectric conversion element array and a second shading-corrected image signal which is an image signal from the second photoelectric conversion element array in accordance with a position of a focus detection area in an image sensing frame ***on the basis of a ratio between a shift amount of a focus detection opening pupil from an optical axis, caused by being limited by an exit window of the photographing optical system, and a width of the focus detection opening pupil.***" Emphasis added.

In an exemplary embodiment, FIGS 6A and 6B illustrate views showing how a focus detection opening pupil is formed by the exit windows of the photographing lens. FIG. 10 illustrates the concept of a focus detection opening pupil from an optical axis, caused by being limited by an exit window of the photographing optical system. In the example of FIG. 10, since the boundary line between the A image pupil area 74a and the B image pupil area 74b passes through the optical axis of the photographing lens, the A image pupil area 74a and B image pupil area 74b differ in area. The intensity difference between the A and B image signals is determined by their area ratio. This area ratio almost coincides with the position of the boundary line between the A image pupil area 74a and the B image pupil area 74b in the focus detection opening pupil 76 defined in this manner. Letting Shift1 be the shift amount of the projection exit

window 71-1 with respect to the optical axis, Shift2 be the shift amount of the projection exit window 72-1 with respect to the optical axis, and t be the shift amount of the center of the focus detection opening pupil 76 with respect to the optical axis, the shift amount t can be given by formula 10. (see, e.g., pages 31-35 of the specification).

The Tsunekawa reference discloses method of detecting the focusing condition of an image forming optical system to an object, in which two images of the object are formed with respective light beams passing through prescribed exit pupil areas lying in almost symmetry to each other with respect to the optical axis of the optical system. The two light beams are sensed to obtain an equal number of picture element data for each of the two images, and based on the thus-obtained picture element data, a correlation between the first and second images in a predetermined equal number of picture elements is sought, by sequentially shifting for the first image from its one end to its opposite end, and sequentially shifting for the second image from its symmetric one end thereto to its opposite end, each by the predetermined number of picture elements. The corresponding mutual positional relationship between the above-described predetermined numbers of picture elements is detected to discriminate whether or not the above-described image forming optical system is in focus to the object.

In the Office Action, the Examiner has cited various passages to assert that Tsunekawa discloses essentially all of the claimed features of claim 1. Applicants have carefully reviewed the entire disclosure of Tsunekawa, including the passages cited by the Examiner, and have found no teaching or suggestion of at least a number of features recited in claim 1, as follows:

Tsunekawa does not teach or suggest "a shift amount of a focus detection opening pupil from an optical axis". Tsunekawa discloses a technique, as shown in FIG. 4, wherein, for the first sensed image IA, a predetermined number of pixels counting from its right end which constitute an image portion PA1, and for the second sensed image, an image portion PB1 including the same number of pixels but counting from the opposite or left side are selected for seeking a correlation between the first and second sensed images. Then, after this first cycle of correlation detection has been completed, a shifting to the left for the first sensed image IA and a symmetric shifting to the right for the second image sensed are caused to take place by

advancing a predetermined number of picture elements (for example, one picture element). At this time, a correlation between the image portions PA2 and PB2 is sought. Such a procedure is repeated until the detection of a correlation between the last image portions PNA and PBN each including predetermined successive picture elements counting from the left for the first sensed image IA and from the right for the second sensed image IB is completed. The number of cycles of correlation detection between the image portions of the first and second sensed images completed is counted. At a time during the course of the correlation detecting operation between the individual image portions in the first and second images sensed, when an optimum correlation is obtained, the resultant number of cycles counted determines the focusing condition of the objective lens LS to that object. [C8, 33-C9, L27]. In other words, Tsunekawa merely discloses a correlation between the first and second images by *symmetrically shifting images by a predetermined number of pixels*. Applicants submit that Tsunekawa's symmetrically shifting images by a predetermined number of pixels is not equivalent to "***a shift amount of a focus detection opening pupil from an optical axis***," as claimed.

Tsunekawa does not teach or suggest "*a ratio between a shift amount of a focus detection opening pupil from an optical axis, caused by being limited by an exit window of the photographing optical system, and a width of the focus detection opening pupil*". One of the aspects of claim 1 is the feature of detecting a focus state by computing a correlation between a first shaded-corrected image signal and a second shaded-corrected image signal ... in accordance with a position of a focus detection area in an image sensing frame **on the basis of a ratio** between a shift amount of a focus detection opening pupil from an optical axis (e.g. **t** in FIG. 10 and equation 10), caused by being limited by an exit window of the photographing optical system, and a width of the focus detection opening pupil (e.g., **T** in FIG. 10 and equation 13). In contrast, Tsunekawa discloses a method of detecting the focusing condition of an image forming optical system to an object, in which two images of the object are formed with respective light beams passing through prescribed exit pupil areas lying in almost symmetry to each other with respect to the optical axis of the optical system. The corresponding mutual positional relationship between the two images is detected to discriminate whether or not the above-described image forming optical system is in focus to the object. As a result, Tsunekawa does not disclose or suggest the feature of "a ratio".

In additions, the Examiner expressly concedes that Tsunekawa "fails to disclose the first and second images are shading corrected images." [Office Action, page 3]. Thus, Tsunekawa is deficient also in this additional aspect. In an effort to fulfill Tsunekawa's deficiency, the Examiner cites Murayama.

The Murayama reference is generally directed to an image processing method suitable for correcting the shading of an image photographed by a sensor such as a CCD camera or the like in which shading (a difference in brightness caused by illumination unevenness) is created. The Examiner cites Murayama's background which teaches that for images that have received the effects of shading, it is necessary to revise the effects of this shading. In other words, Murayama merely discloses that which the Examiner has stated "that is well known to have shading corrected images." [Office Action, bottom of page 3 and top of page 4]. However, there is nothing in Murayama that may teach or suggest the features that Tsunekawa lacks, as discussed above.

As a result, both Tsunekawa and Murayama, either taken alone or in combination, fails to disclose "a computing device which detects a focus state of the photographing optical system by computing a correlation between a first shading-corrected image signal ... and a second shading-corrected image signal ... ***on the basis of a ratio between a shift amount of a focus detection opening pupil from an optical axis ... and a width of the focus detection opening pupil.***

The additional cited references (Sasakura, Kawasaki and Kaneda), either taken alone or in combination, do not cure Tsunekawa's deficiencies as discussed above in reference to independent claim 1. Accordingly, Applicants submit that claim 1 and claims depending thereupon, as currently pending, are patentably distinguishable over all of the cited references.

CONCLUSION

In light of the foregoing remarks and having raised no new issues that would require further search from part of the Examiner, Applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is invited to telephone the undersigned to the number provided below, in order to more expeditiously attend to these matters.

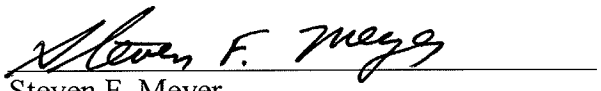
AUTHORIZATION

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **13-4500**, Order No. 1232-5227. A DUPLICATE OF THIS DOCUMENT IS ATTACHED.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **13-4500**, Order No. 1232-5227. A DUPLICATE OF THIS DOCUMENT IS ATTACHED.

Respectfully submitted,
MORGAN & FINNEGAN, L.L.P.

Dated: October 29, 2008.

By: 
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